6. (Twice Amended) The method of operating the single electron device according to claim 5, wherein said step of creating a hole in said silicon nanoparticles is accomplished by irradiating said silicon nanoparticles.

REMARKS

As a preliminary matter, Applicants have amended claim 6 to depend from claim 5 instead of claim 4. This amendment is made to correct an apparent inconsistency, as observed by the Examiner on Page 4, line 12 of the Office Action. Applicants appreciate the Examiner's observation.

Claims 1-2 and 4-8 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants respectfully traverse the rejection.

Particularly, the Office Action states that Applicants' specification must contain enough of a description of how to make 1 nm silicon nanoparticles so that one of ordinary skill could practice the invention claimed. Applicants respectfully submit that such description is clearly provided at least by related Patent Application Serial No. 09/426,389, entitled "SILICON NANOPARTICLES AND METHOD FOR PRODUCING THE SAME". The '389 Application is explicitly incorporated by reference into the present application (see

page 1, lines 12-16), and contains at least a description of how to make 1 nm silicon nanoparticles. Accordingly, Applicants respectfully request reconsideration and withdrawal of the 35 U.S.C. § 112, first paragraph rejection.

Claims 1, 4, 5, and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen in view of Forbes and Pankove. Applicants respectfully traverse the rejection for at least the reason that the cited references do not teach, suggest, or enable a buried gate layer of silicon nanoparticles wherein the silicon nanoparticles have a diameter of approximately 1 nm.

Regarding Chen, the Office Action states, "Examiner agrees that quantum dots are not invisible, or non-existent, and that quantum dots have some dimension in all directions. Examiner disagrees that such dimensions are arbitrary, however....A structure can meet the definition for a quantum dot only if the dimensions in all three directions are approximately the same. At any rate, the prior art cited above provides ample teaching of quantum dots having approximately 1 nm dimension in all three directions." Applicants respectfully traverse this statement.

First, Applicants request citation for the conclusion (apparently based on official notice) that quantum dots must have dimensions along all three directions that are approximately the same. As previously submitted in Response C, a quantum dot may have different shapes such as, but not limited to, a spherical shape and a cylindrical shape.

However, Applicants wish to correct a previously submitted statement. On

page 2, lines 19-20 of Response C, Applicants stated that newly-cited reference Forbes describes a spherical shape. This appears to be incorrect, as Forbes actually states in Col. 4, lines 15-17, "Although the particles may not be formed in a uniform sphere, they can be described as having a general diameter of approximately 10 angstroms to 100 angstroms." (However, the point Applicants were asserting in this portion of Response C is still believed to be correct. For example, Chen and Pankove appear to describe a cylindrical, or needle, shape having thicknesses of "1 to 2 nm" (Chen) and "about 10 angstroms in diameter and depth" (Pankove) respectively. Other shapes are possible, including ellipsoidal, and spherical, as shown in the present application (see FIG. 1, for example)).

Applicants respectfully submit that the description of Forbes does not appear to specifically indicate any particular shape. See, for example, Col. 4, lines 15-17, lines 63-66. Applicants respectfully submit that the ambiguous language of lines 15-17 above, for example, suggests that the shape and/or dimensions of the particles are not actually known in Forbes. Forbes, apparently relying upon previous references, suggests a few possible formation methods for the silicon crystals (Col. 4, lines 10-20), but does not appear to indicate or suggest that any of these techniques are preferable, or even feasible, for particles with a diameter of approximately 10 angstroms. Instead, a general range and unclear shape is disclosed in Forbes, and the description does not appear to suggest that approximately 1 nm in diameter particles were actually achieved in Forbes, nor does Forbes appear to enable such 1 nm diameter particles.

Furthermore, neither Chen nor Pankove appear to provide ample teaching of silicon nanoparticles having a diameter of approximately 1 nm, as claimed. Because the nanoparticles of claims 1, 5, and 8 are substantially spherical, they may be defined in terms of size using a single dimension, that is, diameter. However, other shapes, such as the cylindrical (needle) shapes mentioned above, require description of multiple dimensions to define their shape, if the sizes and shapes can be determined (which may or may not be the case in Forbes).

For these other shapes, recitation of other dimensions strongly suggests that the particles described are not of a spherical shape. Chen, for example, describes a thickness of a quantum dot in Col. 4, line 55. Contrary to the Office Action's statement, this does not "exactly" teach the 1 nm diameter of claims 1, 5, and 8. Thickness is not the same as diameter, but even if, for the sake of argument, as the Office Action states, the quantum dot of Chen has the same diameter as thickness (which is not conceded), this would imply a cylindrical structure, not a sphere. Furthermore, if a quantum dot is the same in "all dimensions", as asserted in the Office Action, this appears to define a box, not a sphere. A box and a cylinder have a significantly different volume than that of a sphere.

Additionally, Pankove indicates a desire to produce a quantum dot of about 10 angstroms in both diameter and depth (col. 5, lines 5-8), but does not appear to provide description to enable production of such particles. Also, Pankove does not appear to disclose or suggest that these are spherical particles, but instead by citing both diameter and depth,

strongly suggests that its particles are cylindrical or needle-shaped particles. This suggestion is reinforced by the figures of Pankove.

In sum, because neither Chen, Forbes, nor Pankove appear to disclose, suggest, or enable at least the approximately 1 nm silicon nanoparticles defined in claims 1, 5, and 8, Applicants respectfully submit that claims 1, 5, and 8 are not rendered obvious by these references. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection as to claims 1, 5, and 8 and their respective dependent claims.

Claims 6 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chen, Forbes, and Pankove and further in view of Matsumura. Applicants respectfully traverse the rejection for at least the reasons stated above as applied to independent claim 1, from which claims 6 and 7 depend, and for at least the additional reason that Matsumura is not believed to remedy the deficiencies of the other cited references with regard to the claims.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **Version with markings to show changes made.**

For at least the foregoing reasons, Applicants believe that this case is in condition for allowance, which is respectfully requested. The Examiner should call Applicants' attorney if an interview would expedite prosecution.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claim 6 has been amended as follows:

6. (Twice Amended) The method of operating the single electron device according to claim 45, wherein said step of creating a hole in said silicon nanoparticles is accomplished by irradiating said silicon nanoparticles.